CLAIMS

1. A method for the prevention or treatment of infection of a patient by an infecting agent comprising reactivating the patient's thymus.

2. The method of claim 1 wherein the patient's thymus has been at least in part deactivated.

3. The method of claim 2 wherein the patient is post-pubertal.

4. The method of claim 2 wherein the patient has or had a disease or treatment of a disease that at least in part deactivated the patient's thymus.

5. The method of claim 1 wherein the reactivation is induced prior to or right after the patient is initially exposed to the infecting agent.

6. The method of claim 1 wherein reactivating the patient's thymus is accomplished through disruption of sex steroid mediated signaling to the thymus.

7. The method of claim 6 wherein the method of disrupting the sex steroid mediated signaling to the thymus is through administration of one or more pharmaceuticals that lower the concentration of sex steroids in a patient.

8. The method of claim 7 wherein the pharmaceuticals are selected from the group consisting of LHRH analogs, anti-LHRH vaccines, and combinations thereof.

9. The method of claim 8 wherein the LHRH analog is an LHRH agonist or an LHRH antagonist.

10. The method of claim 9 wherein the LHRH agonist is selected from the group consisting of Buserelin, Cystorelin, Decapeptyl, Deslorelin, Gonadorelin, Goserelin, Histrelin, Leuprolide, Leuprorelin, Lutrelin, Meterelin, Nafarelin and Triptorelin.

11. The method of claim 9 wherein the LHRH antagonist is selected from the group consisting of Eulexin and Abarelix.

12. The method of claim 6 wherein the method of disrupting the sex steroid mediated signaling to the thymus is through surgical castration of the patient.

13. The method of claim 7 having the further step of delivering at least one cytokine, at least one growth factor, or a combination of at least one cytokine and at least one growth factor to the patient.

14. The method of claim 13 wherein the cytokine is selected from the group consisting of Interleukin 2 (IL2), Interleukin 7 (IL7) and Interleukin 15 (IL15) and combinations thereof.

15. The method of claim 13 wherein the growth factor is selected from the group consisting of members of the epithelial growth factor family, members of the fibroblast growth factor family, Stem Cell Factor, granulocyte colony stimulating factor (GCSF), keratinocyte growth factor (KGF), and combinations thereof.

16. The method of claim 13 wherein the cytokine and/or growth factor is delivered prior to delivery of the LHRH analog, the anti-LHRH vaccine, or the combination thereof.

17. The method of claim 13 wherein the cytokine and/or growth factor is delivered during or after delivery of the LHRH analog, the anti-LHRH vaccine, or the combination thereof.

18. The method of claim 6 further comprising the step of delivering to the patient cells selected from the group consisting of HSC, myeloid progenitor cells, lymphoid progenitor cells and epithelial stem cells.

19. The method of claim 18 wherein the cells are delivered to the patient between about one and three weeks after disruption of sex steroid mediated signaling to the thymus.

20. The method of claim 18 wherein the cells are delivered at the time the thymus begins to be reactivated.

21. The method of claim 18 wherein the cells are genetically modified.

22. The method of claim 21 wherein the genetic modification creates resistance in the cells and their progeny to infection by an external agent.

23. The method of claim 22 wherein the external agent is a virus.

24. The method of claim 23 wherein the virus is selected from the group consisting of HIV, flu virus, hepatitis A virus, hepatitis B virus and hepatitis C virus.

30. A method for enhancing bone marrow productivity in a patient comprising the step of administering an LHRH analog to the patient.

31. A method for preventing or treating disease in a patient, comprising reactivating the thymus of the patient.

32. The method of claim 31, wherein the thymus of the patient has been at least in part atrophied before it is reactivated.

33. The method of claim 32, wherein the patient has a disease that at least in part atrophied the thymus of the patient.

34. The method of claim 32, wherein the patient has had a treatment of a disease that at least in part atrophied the thymus of the patient.

35. The method of claim 34, wherein the treatment is immunosuppression, chemotherapy, or radiation treatment.

36. The method of claim 32, wherein the patient is post-pubertal.

37. The method of claim 31, further comprising administering cells to the patient, wherein the cells are stem cells, progenitor cells, or combinations thereof.

38. The method of claim 37, wherein the stem cells are selected from the group consisting of hematopoietic stem cells, epithelial stem cells, and combinations thereof.

39. The method of claim 37, wherein the progenitor cells are selected from the group consisting of lymphoid progenitor cells, myeloid progenitor cells, and combinations thereof.

40. The method of claim 38, wherein the progenitor cells are selected from the group consisting of lymphoid progenitor cells, myeloid progenitor cells, and combinations thereof.

41. The method of claim 38, wherein the cells are hematopoietic stem cells.

42. The method of claim 41, wherein the hematopoietic stem cells are CD34+.

43. The method of claim 41, wherein the hematopoietic stem cells are autologous.

44. The method of claim 41, wherein the hematopoietic stem cells are not autologous.

45. The method of claim 41, wherein the hematopoietic stem cells are administered when the thymus begins to reactivate.

46. The method of claim 31, wherein the thymus is reactivated by disruption of sex steroid-mediated signaling to the thymus.

47. The method of claim 46, further comprising administering cells to the patient, wherein the cells are stem cells, progenitor cells, or combinations thereof.

48. The method of claim 47, wherein the stem cells are selected from the group consisting of hematopoietic stem cells, epithelial stem cells, and combinations thereof.

49. The method of claim 47, wherein the progenitor cells are selected from the group consisting of lymphoid progenitor cells, myeloid progenitor cells, and combinations thereof.

50. The method of claim 48, wherein the progenitor cells are selected from the group consisting of lymphoid progenitor cells, myeloid progenitor cells, and combinations thereof.

51. The method of claim 48, wherein the cells are hematopoietic stem cells.

52. The method of claim 51, wherein the hematopoietic stem cells are administered at the time disruption of sex steroid-mediated signaling to the thymus is begun.

53. The method of claim 46, wherein the sex steroid-mediated signaling to the thymus is disrupted by surgical castration.

54. The method of claim 46, wherein the sex steroid-mediated signaling to the thymus is disrupted by chemical castration.

55. The method of claim 46, wherein the sex steroid-mediated signaling to the thymus is disrupted by administration of one or more pharmaceuticals.

56. The method of claim 55, wherein the one or more pharmaceuticals is selected from the group consisting of LHRH agonists, LHRH antagonists, anti-LHRH vaccines, anti-androgens, anti-estrogens, SERMs, SARMs, SPRMs, ERDs, armotase inhibitors, anti-progestogens, and combinations thereof.

57. The method of claim 56, wherein the LHRH agonists are selected from the group selected from the group consisting of Eulexin, Goserelin, Leuprolide, Dioxalan derivatives, Triptorelin, Meterelin, Buserelin, Histrelin, Nafarelin, Lutrelin, Leuprorelin, Deslorelin, Cystorelin, Decapeptyl, Gonadorelin, and combinations thereof.

58. The method of claim 56, wherein the LHRH antagonists are selected from the group consisting of Abarelix, Cetrorelix, and combinations thereof.

59. The method of claim 31, wherein clinical symptoms of the disease are reduced as compared to those symptoms that would have otherwise occurred in a patient prior to thymus reactivation.

60. The method of claim 31, wherein the disease is caused by an agent selected from the group consisting of viruses, bacteria, fungi, parasites, prions, cancers, allergens, asthma-inducing agents, "self" proteins and antigens which cause autoimmune disease.

61. The method of claim 60, wherein the agent is a virus.

62. The method of claim 61, wherein the virus is selected from the group consisting of Retroviridae, Picornaviridae, Calciviridae, Togaviridae, Flaviridae, Coronaviridae, Rhabdoviridae, Filoviridae, Paramyxoviridae, Orthomyxoviridae, Bungaviridae, Arenaviridae, Reoviridae, Birnaviridae, Hepadnaviridae, Parvoviridae, Papovaviridae, Adenoviridae, Herpesviridae, Poxviridae, and Iridoviridae.

63. The method of claim 61, wherein the virus is selected from the group consisting of influenza virus, human immunodeficiency virus, and herpes simplex virus.

64. The method of claim 60, wherein the agent is a bacteria.

65. The method of claim 64, wherein the bacteria is selected from the group consisting of *Helicobacter pyloris*, *Borelia burgdorferi*, *Legionella pneumophilia*, *Mycobacteria tuberculosis*, *Mycobacteria. avium*, *Mycobacteria intracellulare*, *Mycobacteria kansaii*, *Mycobacteria gordonae*, *Mycobacteria* sporozoites, *Staphylococcus aureus*, *Neisseria gonorrhoeae*, *Neisseria meningitidis*, *Listeria monocytogenes*, *Streptococcus pyogene*, *Streptococcus agalactiae*, *Streptococcus faecalis*, *Streptococcus bovis*, *Streptococcus pneumoniae*, pathogenic *Campylobacter* sporozoites, *Enterococcus* sporozoites, *Haemophilus influenzae*, *Bacillus antracis*, *Corynebacterium diphtheriae*, *Corynebacterium* sporozoites, *Erysipelothrix rhusiopathiae*, *Clostridium perfringens*, *Clostridium tetani*, *Enterobacter aerogenes*, *Klebsiella pneumoniae*, *Pasturella multocida*, *Bacteroides* sporozoites, *Fusobacterium nucleatum*, *Streptobacillus moniliformis*, *Treponema pallidium*, *Treponema pertenue*, *Leptospira*, and *Actinomyces israelli*.

66. The method of claim 64, wherein the bacteria is a mycobacteria.

67. The method of claim 60, wherein the agent is a parasite.

68. The method of claim 65, wherein the parasite is selected from the group consisting of *Plasmodium falciparum*, *Plasmodium yoelli*, and *Toxoplasma gondii*.

69. The method of claim 67, wherein the parasite is a malaria parasite.

70. The method of claim 60, wherein the agent is an infectious fungi.

71. The method of claim 70, wherein the infectious fungi is selected from the group consisting of *Cryptococcus neoformans*, *Histoplasma capsulatum*, *Coccidioides immitis*, *Blastomyces dermatitidis*, *Chlamydia trachomatis*, *Candida albicans*.

72. The method of claim 60, wherein the agent is a cancer.

73. The method of claim 72, wherein the cancer is selected from the group consisting of cancers of the brain, cancers of the lung, cancers of the ovary, cancers of the breast, cancers of the prostate, cancers of the colon, and cancers of the blood.

74. The method of claim 60, wherein the agent is an allergen.

75. The method of claim 74, wherein the allergen causes an allergic condition selected from the group consisting of eczema, allergic rhinitis, allergic coryza, hay fever, bronchial asthma, urticaria (hives), and food allergies.

76. The method of claim 60, wherein the patient was exposed to the agent prior to thymus reactivation.

77. The method of claim 60, wherein the patient was not exposed to the agent prior to thymus reactivation.

78. The method of claim 31, further comprising administering at least one cytokine, at least one growth factor, or a combination of at least one cytokine and at least one growth factor to the patient.

79. The method of claim 78, wherein the cytokine is selected from the group consisting of Interleukin 2 (IL-2), Interleukin 7 (IL-7), Interleukin 15 (IL-15), and combinations thereof.

80. The method of claim 78, wherein the growth factor is selected from the group consisting of members of the epithelial growth factor family, members of the fibroblast growth factor family, stem cell factor, granulocyte colony stimulating factor (G-CSF), keratinocyte growth factor (KGF), and combinations thereof.

81. The method of claim 79, wherein the growth factor is selected from the group consisting of members of the epithelial growth factor family, members of the fibroblast growth factor family, stem cell factor, granulocyte colony stimulating factor (G-CSF), keratinocyte growth factor (KGF), and combinations thereof.

82. A method for delivering a sex steroid analog to a patient, comprising:

laser-irradiating the skin of the patient to create perforations or alterations in the skin, and

placing the sex steroid analog on the irradiated skin,

wherein the sex steroid analog is delivered through the perforations or alterations in the irradiated skin.

83. A method for delivering a sex steroid analog to a patient, comprising:

delivering the sex steroid analog to the skin of the patient, and

permeabilizing the skin of the patient with high pressure impulse transients,

wherein the impulse transients cause the sex steroid analog to diffuse through the permeabilized skin of the patient.

84. A method for enhancing transplantation of donor hematopoietic stem cells into the thymus of a recipient patient, comprising:

depleting the T cells of the patient,

reactivating the thymus of the patient, and

transplanting donor hematopoietic stem cells to the patient,

wherein uptake of the donor hematopoietic stem cells into the patient's thymus is enhanced as compared to the uptake that would have otherwise occurred in a patient prior to thymus reactivation.

85. A method for increasing virus-specific peripheral T cell responsiveness of a patient with an at least partially atrophied thymus, comprising:

reactivating the thymus of the patient,

exposing the patient to a virus,

determining the virus-specific peripheral T cell responsiveness in the patient,

wherein the patient has an increased viral-specific peripheral T cell responsiveness as compared to the responsiveness that would have otherwise occurred in a patient prior to thymus reactivation.

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